REMARKS

The rejection of claims 1-47 under 35 U.S.C. § 102(b) as anticipated by "Bottomley" (of record) is without merit and will not be sustainable by the examiner on appeal. A claim is anticipated by a reference only where that reference teaches each and every limitation of the claim, in the identical arrangement as claimed.

Before detailing why Bottomley fails as a matter of law to anticipate any pending claim, Applicant notes several significant procedural and legal errors in the Office Action. First, dependent claims 5, 6, 21, and 35 are rejected as anticipated under 35 U.S.C. § 102(b) by Bottomley, yet these same claims are rejected as obvious under 35 U.S.C. § 103(a) in view of Bottomley, in further view of "Jasper" (of record). The obviousness arguments state that Bottomley alone does not teach all limitations of claims 5, 6, 21, and 35, but that the missing teachings are provided by Jasper.

However, the anticipation rejections of these same claims state that Bottomley teaches all claim limitations. More accurately, the anticipation rejections of these claims state that Bottomley teaches all of their limitations, but the rejection arguments also talk about what would have been obvious to one skilled in the art. It is wholly unclear whether the examiner is simply trying to explain the reasoning underlying the allegation that Bottomley teaches the claim limitations at issue, or whether the examiner is taking "Official Notice" of what is known in the art. (This point is especially confusing because the examiner's use of Jasper in the obviousness rejections does not appear to relate directly to the obviousness discussions in the anticipation rejections of these claims.)

In any case, the examiner's attention is drawn to MPEP 2144.03 A, which makes clear that the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as to defy dispute." While the precise intent of the examiner in making obviousness-type discussions in the context of the

anticipation rejections is not clear, Applicant submits that the examiner either is improperly taking Office Notice of facts not supported by the evidentiary record, or is making an improper anticipation rejection. In either case, should the examiner persist with these rejections, Applicant requests clarification of the record, for a further opportunity to better respond.

Claims 1-16 are not anticipated by Bottomley

The evidentiary record developed by the examiner utterly fails to support the anticipation rejection of claims 1-16 over Bottomley. In arguing that Bottomley anticipates claims 1-16, the examiner uses a legally impermissible claim construction and/or ignores explicit claim limitations that demonstrably are not taught by Bottomley.

In more detail, independent claim 1 carefully sets forth an embodiment of Applicant's invention directed to a method of determining received signal quality for a received signal in an inter-symbol interference canceling receiver. Claim 1 includes the following limitations:

> generating an estimate of inter-symbol interference in the received signal;
> scaling the estimated inter-symbol interference by a cancellation metric comprising a scalar value corresponding to inter-symbol interference cancellation performance of the receiver; and
> estimating the received signal quality based on the scaled estimate of inter-symbol interference.

(Emphasis added.)

The examiner alleges that Section III B of Bottomley teaches the claimed "generating an estimate of inter-symbol interference in the received signal." As the examiner correctly notes, Section III B of Bottomley describes the determining of RAKE finger delays and Generalized RAKE combining weights. As that section of Bottomley explains, RAKE finger delays correlate to received signal delays (i.e., multipath delays). RAKE finger delays self-evidently are not estimates of inter-symbol interference.

That same section details the computation of Generalized RAKE combining weights w. As Bottomley explains for the Generalized RAKE context, these combining weights are used to combine corresponding despread values ("finger outputs") from a plurality of RAKE fingers.

Bottomley in Eq. 9 states that combining weights are formed as $w = R_u^{-1} h$, where h represents

propagation channel estimates, and R_u^{-1} represents an impairment covariance matrix.

     Bottomley explains that the impairment covariance matrix R_u^{-1} reflects the effects of

colored noise arising from, e.g., intracell interference. However, the covariance matrix itself

cannot legally be construed as the claimed estimate of the inter-symbol interference. The other

noise terms discussed are thermal and other-cell/background noise, which Bottomley

represents as Guassian white noise. That white noise cannot legally be construed as the

claimed estimate of inter-symbol interference. Thus, there is no evidence to support the

assertion that Bottomley teaches the first element of claim 1. Arguing that Bottomley does

provide such teachings represents an impermissibly overbroad construction of the claim

language, or represents a failure to consider explicit claim limitations, or represents a profound

misunderstanding of Bottomley.

     Further, Bottomley does not teach the claimed limitation of "scaling the estimated inter-

symbol interference by a cancellation metric comprising a scalar value corresponding to inter-

symbol interference cancellation performance of the receiver." Section III B of Bottomley

describes the application of combining weights to finger outputs.

     The combining weights are described as matrix/vector terms that depend on propagation

channel characteristics and the covariance of interference across RAKE fingers. Self-evidently,

the combining weights cannot be argued as the claimed "estimated inter-symbol interference,

nor argued as the claimed cancellation metric, which represents the inter-symbol interference

cancellation performance of the receiver. See, e.g., paragraphs 0030 and 0031 of the instant

application for an example discussion of the cancellation metric. Bottomley never describes a

scalar value that corresponds to the inter-symbol interference cancellation performance of the

receiver, such that an estimate of such interference can be scaled as claimed (to approximate the known or expected interference suppression that will occur in the receiver).

Still further, the finger outputs in Bottomley represent the despread received signal values output by the RAKE fingers. Self-evidently, the finger outputs cannot be argued either as the claimed cancellation metric or as the claimed estimate of inter-symbol interference.

Thus, Arguing that Bottomley does provide such teachings represents an impermissibly overbroad construction of the claim language, or represents a failure to consider explicit claim limitations, or represents a profound misunderstanding of Bottomley.

Finally, with respect to claim 1, Bottomley does not teach the claimed limitation of estimating the received signal quality based on the scaled estimate of inter-symbol interference. Section IV of Bottomley, on which the examiner specifically bases the anticipation of this claim limitation, explicitly defines a computed signal-to-noise ratio (SNR) as being taken at the output of the (RAKE) combiner. See Eq. 43 in Bottomley, which explicitly shows Bottomley's SNR computation as depending on the combining weights w and being taken at the output of a RAKE combiner.

In contrast, the claimed limitation estimates received signal quality not based on the actual computation and application of RAKE combining weights, but rather simply by scaling the estimate of inter-symbol interference by the scalar-valued cancellation metric, which corresponds to the receiver's ISI-metric. Indeed, the instant application notes that it avoids the problem of having to wait for the computation of combining weights and their application to the received signal before estimating signal quality. See, e.g., paragraphs 0007 and 0025 of the instant application, which explain that the determination of combining weights, such as detailed in Section III B of Bottomley is a computationally intensive undertaking. Advantageously, then, the claimed invention provides for the estimation of signal quality that reflects the expected or

known inter-symbol interference cancellation performance of the receiver, without having to wait for the calculation and application of combining weights.

Further, Applicant notes that claim 1 is directed to a method of signal quality estimation "in an inter-symbol interference canceling receiver." In contrast, Section IV of Bottomley represents the author's performance analysis presented for the Generalized RAKE receiver architecture of Bottomley.

As Bottomley does not anticipate claim 1, Bottomley likewise does not anticipate any of its dependent claims 2-16. However, Applicant takes this opportunity to present further arguments for selected ones of these dependents.

For example, claim 5 includes the limitation of "storing the cancellation metric [from claim 1] in a memory of the receiver as a pre-configured value." Bottomley does not teach a cancellation metric within the meaning of claim 1, and demonstrably does not teach storing the cancellation metric in receiver memory as a pre-configured value. The examiner's anticipation argument inexplicably states that claim 5 is anticipated because one skilled in the art would know that a maximum-likelihood sequence estimator or decision feedback equalizer are capable of suppressing ISI and that they adaptively update their tap coefficients.

Setting aside whether this is an inappropriate attempt to take "Office Notice" of interference suppression techniques, Applicant simply notes that the rejection argument has no connection to the claimed limitation.

Similarly, the rejection argument given against claim 6 has no relation to the limitations of claim 6. Claim 6 includes the limitation of "determining the pre-configured value of the cancellation metric by characterizing inter-symbol interference cancellation performance of the receiver, or of a same type of receiver." Thus, claims 5 and 6 together describe characterizing the inter-symbol cancellation performance of a receiver, setting the value of a scalar cancellation metric based on the characterized interference cancellation performance, and

storing that cancellation metric as a pre-configured value in a receiver's memory, so that the

receiver can generate, during its live operation, scaled estimates of inter-symbol interference

that reflect the known or expected interference cancellation performance of the receiver.

Against these explicitly claimed limitations, the examiner states that Bottomley's

combining weights are derived from maximum likelihood principles, and that one skilled in the

art would know that an equalizer would be a maximum likelihood sequence estimator capable of

suppressing ISI by adaptively updating its tap coefficients *stored in the tapped-delay line in the*

equalizer. This argument is completely irrelevant to the actual claim limitations and further

represents improper use of Official Notice.

Claims 17-16 are not anticipated by Bottomley

The evidentiary record developed by the examiner utterly fails to support the anticipation

rejection of claims 17-30 over Bottomley. In arguing that Bottomley anticipates independent

claim 17 and its dependent claims 18-30, the examiner uses a legally impermissible claim

construction and/or ignores explicit claim limitations that demonstrably are not taught by

Bottomley.

In more detail, independent claim 17 carefully sets forth an embodiment of Applicant's

invention directed to a processing circuit configured for use in an inter-symbol interference

canceling receiver. The claimed processing circuit includes these elements:

> an interference estimation circuit configured <u>to generate an estimate of inter-</u>
> <u>symbol interference in the received signal</u>;
> a scaling circuit included in, or associated with, the interference estimation circuit
> and configured <u>to scale the estimated inter-symbol interference by a</u>
> <u>cancellation metric</u> comprising a scalar value <u>corresponding to inter-symbol</u>
> <u>interference cancellation performance of the receiver</u>; and
> a signal quality estimation circuit configured <u>to estimate the received signal</u>
> <u>quality based on the scaled estimate of inter-symbol interference</u>.

(Emphasis added.)

At least for reasons as given above in the discussion of Claim 1, Bottomley fails as a

matter of law to anticipate claim 17. Consequently, Bottomley does not anticipate any of

dependent claims 18-30. Moreover, Applicant notes that the rejection arguments given against dependent claims 18-30 repeat the inappropriate statements regarding what one skilled in the art would know—this represents improper "Official Notice" whether or not the examiner denominates those statements as such—made against various dependent claims under claim 1, and refer back to the same rejection arguments, which are irrelevant to the actual claim limitations at issue.

<u>Claims 31-44 are not anticipated by Bottomley</u>

The evidentiary record developed by the examiner utterly fails to support the anticipation rejection of claims 31-44 over Bottomley. In arguing that Bottomley anticipates independent claim 31 and its dependent claims 32-44, the examiner uses a legally impermissible claim construction and/or ignores explicit claim limitations that demonstrably are not taught by Bottomley.

In more detail, independent claim 31 carefully sets forth an embodiment of Applicant's invention directed to a wireless communication device for use in a wireless communication network. The device includes these elements:

> a receiver configured to receive signals from the network;
> a transmitter configured to transmit signals to the network;
> one or more control circuits configured to control operation of the receiver and
>   transmitter; and
> said receiver comprising one or processing circuits comprising:
> an interference estimation circuit configured <u>to generate an estimate of inter-</u>
>   <u>symbol interference in the received signal</u>;
> a scaling circuit included in, or associated with, the interference estimation circuit
>   and configured <u>to scale the estimated inter-symbol interference by a</u>
>   <u>cancellation metric</u> comprising a scalar value corresponding to inter-symbol
>   interference cancellation performance of the receiver; and
> a signal quality estimation circuit configured <u>to estimate the received signal</u>
>   <u>quality based on the scaled estimate of inter-symbol interference</u>.

(Emphasis added.)

At least for reasons as given above in the discussion of Claim 1, Bottomley fails as a matter of law to anticipate claim 31. Consequently, Bottomley does not anticipate any of dependent claims 32-44.

Claims 5, 6, 21, and 35 are not obvious over Bottomley and Jasper

In rejecting claims 5, 21, and 35 as obvious over Bottomley in view of Jasper, the examiner states that Bottomley teaches everything in these claims but the storage of the claimed cancellation metric as a pre-configured value in receiver memory. The examiner alleges that Jasper supplies this missing limitation at col. 10, lines 20-22. Jasper simply states that portions of equations (1), (11), and (13) may be precomputed and stored in memory by Japser's "weight calculator 62." As an example of what may be precomputed, Japser states that "the vector of pilot interpolation coefficients may be precalculated and stored in memory. Jasper also states that the Cholesky triangle of an interference covariance/channel estimate matrix expression may be stored in memory.

Plainly, these teachings describe storing values for combining weight computations and do not teach storing the claimed "cancellation metric" as a pre-configured value in memory. Again, the claims and the specification make clear that the cancellation metric is a scalar value that reflects the known or expected inter-symbol interference cancellation performance of the receiver. Applicant did not claim pre-storing any type of value, such that any pre-storage teachings are available for use in rejecting the claims; rather, Applicant claimed storing the explicitly claimed cancellation metric in memory as a pre-configured value. Jasper does not teach the claimed cancellation metric, nor does Bottomley, and the combination of these two references therefore fails as a matter of law to make claims 5, 21, and 35 obvious.

Further, claim 6 depends from claim 5 and adds the further limitation that the cancellation metric is based on characterizing the interference cancellation performance of the

receiver. The examiner states that Equation 1 of Jasper teaches this limitation. That assertion is

wholly unsupported by Jasper. At col. 5, lines 25+, Jasper gives its Equation 1 as,

$$w = \alpha K_{i+n}^{-1} b^{*},$$

where w is a (combining) weight vector and not the claimed pre-configured, scalar-valued

cancellation metric representing the characterized interference cancellation performance of a

receiver. Further, Jasper explains that α is a symbol decision threshold (for demodulation

symbol detection), that K_{i+n}^{-1} is the estimated interference-plus-noise spatial covariance matrix

(measured for the received signal), and b^{*} is the complex conjugate of the estimated (antenna)

array response, which is an antenna array "steering vector" for the desired signal in Jasper.

Which bits of Equation 1 represent a scalar value that is pre-configured based on

characterizing the interference cancellation performance of Jasper's receiver is left unexplained

by the examiner. In view of Applicant's explanation of the actual teachings of Jasper, if the

examiner persists in the use of Jasper, Applicant respectfully requests that the examiner provide

at least some explanation as to how Jasper is alleged to teach the claim limitations at issue.

<u>Closing</u>

It may have been appropriate in this response simply to state that Bottomley (or Jasper)

provides no teachings that support the anticipation and obviousness rejections, because even a

cursory analysis of Bottomley reveals that it does not support the rejection arguments. However,

Applicant provided a more detailed response in the interest of definitively eliminating Bottomley

as a reference in any future rejections that might issue. (Applicant believes that all pending

claims stand in condition for immediate allowance.)

Should the examiner persist in the use of Bottomley, Applicant respectfully requests that

the examiner provide a more detailed explanation of the specific teachings in Bottomley that are

relied on. For example, to give Applicant a fair opportunity to understand the examiner's

perspective on Bottomley, Applicant respectfully suggests that the examiner identify any specific

equations, variable, or text in Bottomley that the examiner understands as directly supporting

any rejection argument. Further, the undersigned attorney would welcome a phone call from the

examiner to discuss Bottomley, this response, or any other aspect of the instant application.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

Dated: August 9, 2007   Michael D. Murphy
                                         Registration No.: 44,958

                                         1400 Crescent Green, Suite 300
                                         Cary, NC 27518
                                         Telephone: (919) 854-1844
                                         Facsimile: (919) 854-2084